

### **REMARKS**

Claims 1-16 are pending. Claims 1 and 6 are amended. The amendments are supported by the specification and the originally filed claims. In particular, the amendments to claims 1 and 6 are supported by the specification at page 2, lines 5-10, the paragraph bridging pages 6-7, and the working examples (e.g., Example 1, paragraph bridging pages 11-12; Example 6, page 15, last paragraph; Example 9, page 18, last full paragraph; and Examples 11-12). No new matter is added.

Entry of this Amendment is proper under 37 C.F.R. § 1.116 since this Amendment: (a) places the application in condition for allowance for reasons discussed herein; (b) does not raise any new issue regarding further search and/or consideration since the Amendment amplifies issues previously discussed throughout prosecution; (c) does not present any additional claims without canceling a corresponding number of finally-rejected claims and (d) places the application in better form for appeal, should an appeal be necessary. Entry of the Amendment is thus respectfully requested.

Applicants again thank the Examiner for the indication that claims 4 and 5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 1-3, 6-9 and 11-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Abusleme et al. (EP 1,038,914) in view of Stoeppelmann (U.S. Patent No. 5,869,157). This rejection is traversed.

The presently claimed invention is directed to multilayer manufactured articles comprising at least "a layer consisting essentially of thermoprocessable copolymers" and

a polyamide layer, "wherein there is adhesion between the layers of A) and B)." (present claims 1 and 6). Applicants respectfully submit that the claimed combinations of layers and the unexpected adhesion thereof are not taught or suggested by the cited references.

In particular, the multilayer manufactured articles of claim 1 comprise "B) a layer consisting essentially of polyamides having an amount of  $\text{-NH}_2$  end groups in the range of 40-300 $\mu\text{eq/g}$ ." The adhesion to the thermoprocessable copolymers of layer A) is obtained without using diamine, crosslinking agent, annealing or prolonged storage, as is required by Abusleme et al. and/or Stoeppelmann when using a polyamide having excess  $\text{-NH}_2$  end groups (for example, see Stoeppelman, column 4, lines 19-26). Indeed, the working examples of the present application show that a polyamide having a content of  $\text{-NH}_2$  end groups higher than 50  $\mu\text{eq/g}$  adheres to the ECTFE (or ETFE) containing acrylic monomers of formula (a) without using a diamine, crosslinking agent, annealing or prolonged storage (see, e.g., Examples 1, 3 and 6).

As the diamine and crosslinking agent are used in the cited prior art to obtain adhesion between a fluoropolymer and a polyamide having an excess of amino end groups, these ingredients do not adversely affect the adhesion achieved. However, the achievement of such adhesion despite the lack of these ingredients provides one of the novel and basic characteristics of the present invention of claim 1. Accordingly, Applicants submit that these ingredients are properly considered as elements that do not materially affect the basic and novel characteristics of the present invention.

Further, the same considerations are applicable to the annealing or prolonged storage treatments that are taught by the cited references to obtain adhesion, and are also not required by the presently claimed invention to obtain adhesion.

Applicants note that the achievement of "adhesion" in the present invention is represented by the fact that there is no separation between layers A) and B) even in the absence of an adhesion promoter, such as diamine, crosslinking agent, annealing or prolonged storage (present claims 1 and 6). Indeed, where mechanical force was applied to attempt to separate the layers, the delamination force could not be measured. As demonstrated by Example 1, "[b]y applying a mechanical force one tries to separate layer A from layer B. [However,] [o]ne cannot measure the adhesion force between layer A and layer B. By increasing the force to separate the layers, one breaks the manufactured article without obtaining delamination. This shows that the laminate according to the invention shows a high adhesion" (Specification, paragraph bridging pages 11-12).

Applicants respectfully submit that claim 1 would not have been obvious to those of skill in the art, as the combined disclosures of Stoeppelmann and Abusleme et al. clearly teach away from the presently claimed invention. In particular, Stoeppelmann and Abusleme et al. teach that "a polyamide ... with an excess of amino end groups is used without a diamine [as in present claim 1] ... adequate adhesion cannot be achieved after the coextrusion process" without any additional ingredients or post treatments (Stoeppelmann, column 3, lines 5-10 and column 4, lines 19-26).

Applicants also submit that no adhesion has been observed between a polyamide having excess NH<sub>2</sub> end groups not admixed with a diamine and fluoropolymer, such as ECTFE, not containing acrylic monomer (a). Comparative Example 5 demonstrates that a polyamide having 110 µeq/g of -NH<sub>2</sub> end groups not admixed with a diamine (as in claim 1) does not adhere to ECTFE. In fact, it is unexpected that the same polyamide behaves completely different, i.e., adheres, when the fluoropolymer ECTFE contains the acrylic monomer (a).

Claim 2 is directed to the “[m]ultilayer manufactured articles according to claim 1, in which the polyamide of B) contains one or more diamines.” Dependent claim 2 is patentable for at least the same reasons as independent claim 1. For example, as noted above, the multilayer manufactured articles of claims 1 and 2 are distinguishable from the combined disclosures of Abusleme and Stoeppelmann as alleged by the Examiner in that they do not require crosslinking agent in the fluorinated layer A). The multilayer manufactured articles of claim 1 include “A) a layer consisting essentially of thermoprocessable copolymers ...” (emphasis added).

Further, as diamine is an optional ingredient of claim 1 that is not necessary for adhesion and claim 2 is dependent on claim 1, the diamine of claim 2 is also not necessary for adhesion between A) and B) of claim 1. As explained above, this optional use of diamine is supported by the fact that adhesion between the layers of A) and B) of claim 1 is obtained without diamine when using “polyamides having an amount of -NH<sub>2</sub> end groups in the range of 40-300 µeq/g” (claim 1). See Examples 1, 3 and 6. The specification also discloses that “the polyamide of layer B) [of claim 1] can optionally

contain one or more diamines" (Specification, page 6, lines 19-20). Thus, the diamine in the polyamide of B) of the multilayer manufactured articles of claim 2 is not used to achieve an adhesion between the layers of A) and B) of claim 1, as the adhesion between the layers of A) and B) is already achieved without diamine.

Meanwhile, claim 6 is directed to multilayer manufactured articles that include "B) a layer based on polyamides having an amount of  $\text{-NH}_2$  end groups lower than  $40 \mu\text{eq/g}$ , blended with 0.01-5% by weight of one or more diamines." The adhesion to the thermoprocessable copolymers of layer A) is obtained without using crosslinking agent, annealing or prolonged storage, as is required by Abusleme et al. and/or Stoeppelmann when using a polyamide balanced in  $\text{-NH}_2$  end groups and admixed with a diamine (for example, see Stoeppelman, column 4, lines 19-26). As the crosslinking agent is used in the cited references to obtain adhesion between a fluoropolymer and a balanced polyamide admixed with diamine, these ingredients do not adversely affect the adhesion achieved. However, the achievement of adhesion despite the lack of a crosslinking agent, in direct contrast to the teachings of the cited references, provides one of the novel and basic characteristics of the present invention. Accordingly, Applicants submit that this ingredient is properly considered an element that does not materially affect the basic and novel characteristics of the present invention of claim 6.

Further, Applicants maintain that those of skill in the art would not have been motivated to use the tie layer of Stoeppelmann inside the multilayers of Abusleme et al. to increase the adhesion, as the multilayers of Abusleme et al. are already adhered by means of crosslinking agent.

Applicants also respectfully submit that Stoeppelmann does not disclose that "[t]he amount of  $\text{-NH}_2$  groups in this alternative embodiment [diamine and polyamide having an equal amount of  $\text{-NH}_2$  and  $\text{-COOH}$  groups] should be about 35  $\mu\text{eq/g}$ " as recited on page 3 of the Office Action. In contrast, Stoeppelmann merely discloses "a specific embodiment of the invention in that a polyamide **12** having ... a carboxyl end group number (end group concentration) of approximately 20  $\mu\text{eq/g}$  and a  $\text{NH}_2$  end group number (end group concentration) of 50  $\mu\text{eq/g}$  and a diamine such as decyldiamine or dodecyldiamine are extruded together" (Stoeppelmann, column 4, lines) (emphasis added). This disclosure is directed to concentrations of  $\text{-COOH}$  and  $\text{-NH}_2$  groups where polyamide with an excess of amino acid groups is employed with diamine. Applicants submit that the Examiner's calculation of 35  $\mu\text{eq/g}$  each of  $\text{-COOH}$  end groups and  $\text{-NH}_2$  end groups for an embodiment without diamine where the polyamide is balanced in amino end groups is purely speculative, as this calculation does not incorporate the absence of diamine, and improperly uses a hindsight analysis in view of the disclosure of the present invention.

Regardless, as noted above, the present invention would not have been obvious to those of skill in the art as Abusleme et al. and Stoeppelmann teach that a crosslinking agent in layer A) or annealing or prolonged storage of the multilayer is required to achieve adhesion. Applicants emphasize that the present invention does not require a crosslinking agent in layer A) or annealing or prolonged storage of the multilayer to achieve adhesion.

As far to the phrase "consisting essentially of", Applicant submits that diamine and crosslinking agent are negligible, as they are merely optional components that would not materially affect the basic and novel characteristics of the present invention

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-3, 6-9 and 11-16 under 35 U.S.C. § 103(a) as being unpatentable over Abusleme et al. in view of Stoeppelmann.

Claim 10 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Abusleme et al. (EP 1,038,914) in view of Stoeppelmann (U.S. Patent No. 5,869,157) in view of Krause et al. (U.S. Patent No. 5, 958,532). This rejection is traversed.

Applicants respectfully submit that dependent claim 10 is patentable for at least the same reasons as independent claim 1. Please see the above discussion distinguishing claim 1 from the Abusleme et al. and Stoeppelmann.

Applicants respectfully submit that Krause et al. does not satisfy the above discussed deficiencies of Abusleme et al. and Stoeppelmann, as Krause et al. does not teach or suggest obtaining the adhesion between the layers of claim 1 without diamine, a crosslinking agent, annealing or prolonged storage to obtain adhesion (which are required by Abusleme et al. and Stoeppelmann). In contrast, Krause et al. merely discloses that "[c]ross-linking and adhesion of the layers can occur through a number of extrusion techniques. The preferred method utilizes an autoclave amine cure system, with temperature and pressure at 320° F. and 80 PSI, respectively. Another method utilizes a continuous autoclave and salt bath with temperature and pressure at 400-500°

F. and 1 atm, respectively. Still other methods can also be used" (Krause et al., column 4, lines 59-65).

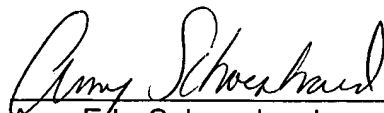
For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Abusleme et al. in view of Stoeppelmann in view of Krause et al.

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.



In the event that this paper is not considered to be timely filed, an appropriate extension of time is requested. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account Number 01-2300, referencing Docket Number 108910-00057.

Respectfully submitted,

  
\_\_\_\_\_  
Amy E.L. Schoenhard  
Registration Number 46,512

Customer Number 004372  
ARENT FOX PLLC  
1050 Connecticut Avenue, NW, Suite 400  
Washington, DC 20036-5339  
Telephone: 202-857-6000  
Fax: 202-857-6395

Enclosure: Petition for Extension of Time (2 months)